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SPINY LOBSTER
GEAR AND FISHING METHODS

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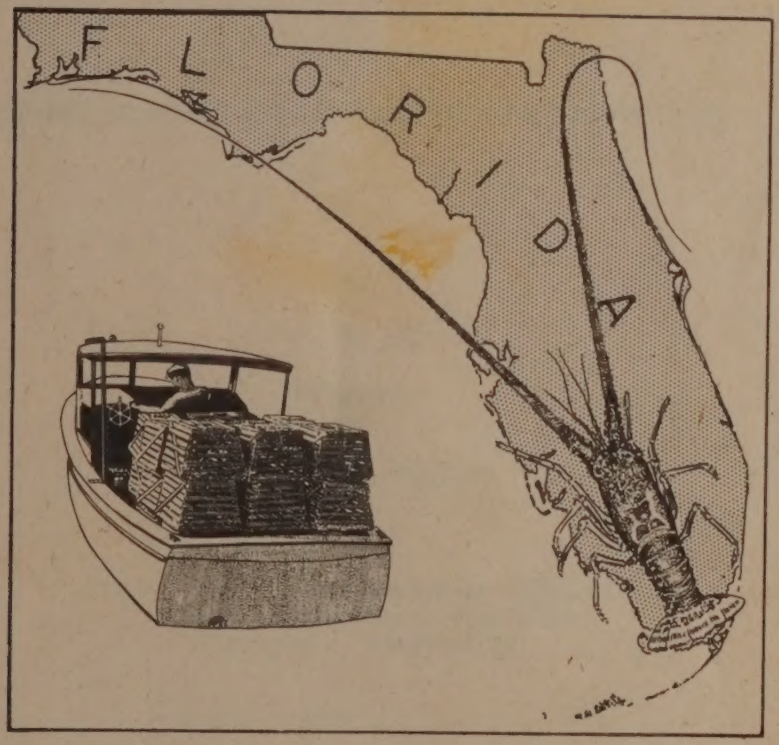
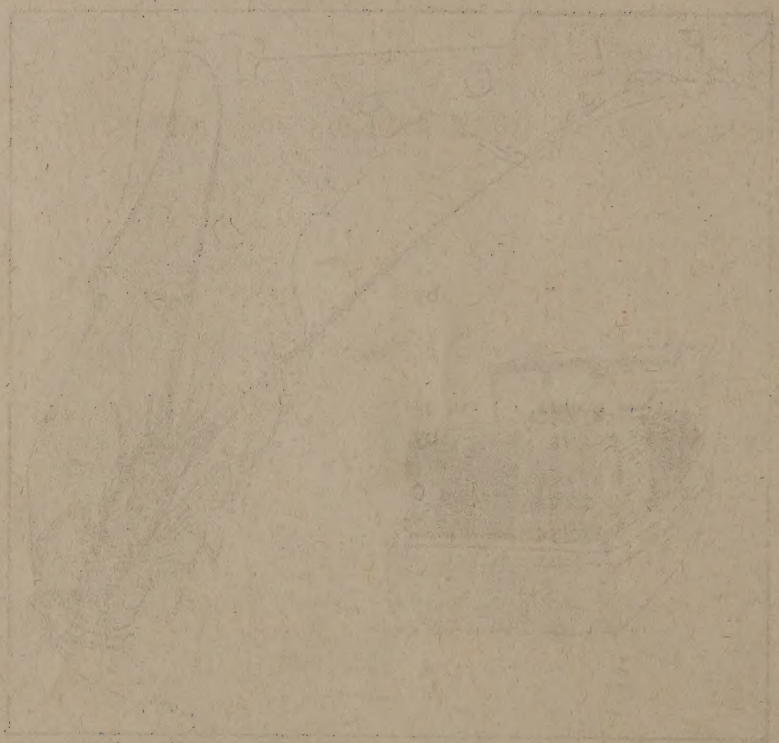


FISH AND WILDLIFE SERVICE

United States Department of the Interior

Washington, D.C.

FISHERY LEAFLET 487



UNITED STATES DEPARTMENT OF THE INTERIOR, Fred A. Seaton, Secretary
Fish and Wildlife Service, Arnie J. Suomela, Commissioner
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SPINY LOBSTER GEAR AND FISHING METHODS

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Fish and Wildlife Service
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INTRODUCTION

This publication was prepared in order to help answer the increasing number of inquiries concerning the gear and methods used in the spiny lobster fishery. The gear and methods described are known and used specifically in the Florida area. Modified versions may be found in other areas since the spiny lobsters' range includes the tropical, sub-tropical, and some temperate, seas of the world (Chase and Dumont, 1949). At present, commercial spiny lobster fishing is practiced in Florida, throughout the Caribbean, Central America, South America, Mexico, South Australia, Korea, and other countries of the Far East. Several closely related species are involved.

To catch the spiny lobster Panulirus argus, Florida fishermen have effectively used several types of gear and fishing methods. Although some of these are now illegal in Florida, they may be permitted in other areas where fishing regulations differ. Persons interested in spiny lobster fishing should familiarize themselves with the existing laws of the area to be fished.

Certain factors of spiny lobster biology bear directly on the gear and methods used to catch them. They are taken mainly in waters less than 50 feet deep, although they are known to occur in greater depths. Smith (1948), and others, have studied spiny lobster migrations and have found that they move between inshore and offshore waters as well as along shore during various periods of their life cycles. A knowledge of these movements, as they relate to seasonal, weather, and water conditions of an area, is used by fishermen in planning their operations.

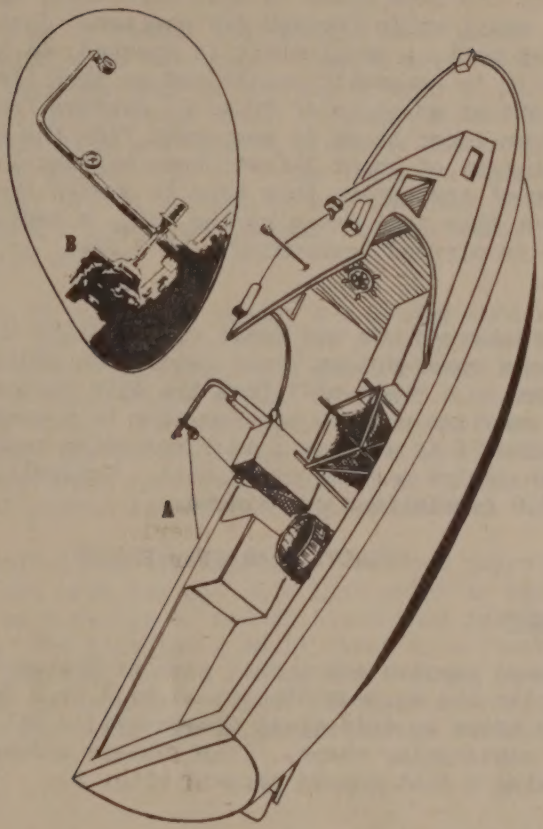

Figure 1 - A typical spiny lobster motor launch: A - Gypsy head powered from the main engine; and B - Gypsy head powered by a small gasoline engine.

BOATS AND DECK FITTINGS

There is little standardization in spiny lobster boat design. Boats used range from 14-foot skiffs, which are rowed or are outboard-engine powered, to motor launches (fig. 1).

The typical commercial launch is wooden hulled, of shallow draft, 26 to 36 feet long, and is powered by an engine of 125 to 150 horsepower. Diesel engines, marine gasoline engines, and converted automobile engines are used. The diesel's cheaper maintenance and fuel costs make it the preferred engine, but its higher purchase cost prevents most boat owners from installing it. For this reason marine gasoline engines and converted automobile engines are much more commonly used.

Most of the deck space is open work area, although many launches have a small cabin forward for shelter. Just aft of the cabin on the port rail, a small davit is mounted, to help lift the traps. This davit is generally positioned so that its horizontal portion points aft at an angle of 20 to 35 degrees from the side of the boat. An open-faced block is suspended from the outboard end of the davit at a height of about 7 feet above the deck. As the traps are lifted clear of the water, they tend to strike the side of the boat. To prevent this from damaging the hull, a replaceable piece of 1/4-inch marine plywood, measuring 6 by 3 feet, is fastened to the impact area.

Some fishermen use the davit to hand-lift their traps while others use a power-driven gypsy head. The gypsy head may be powered either by a "take-off" from the main engine or by a separate small gasoline engine, usually of 1 to 5 horsepower (fig. 1B). When a power take-off is used, a 2 to 1 reduction gear is installed between the main engine and the gypsy head. Generally the speed of the latter is 250 revolutions per minute.

CURRENT GEAR AND METHODS

Wooden Lath Traps

The most popular commercial gear is the wooden lath trap. Florida law limits its maximum dimensions to 3 by 2 feet. Some fishermen build traps to this size; others reduce all dimensions but retain the rectangular shape. Still others reduce top dimensions only, thus forming a flat-topped pyramid (fig. 2).

Trap frames are constructed of 1- by 2-inch strips of pine, spruce, or cypress, the latter being preferred for its durability. The frames are assembled with sixpenny box nails. Laths measuring 3/8 inches by 1½ inches, spaced 1 to 1½ inches apart, are nailed to the frame with 3-penny box nails. Trap bottoms are made of 1-by 4-inch, 1- by 6-inch, or 1- by 8-inch pine, spruce, or cypress boards. Traps are often made of rough-cut lumber which approximates these measurements.

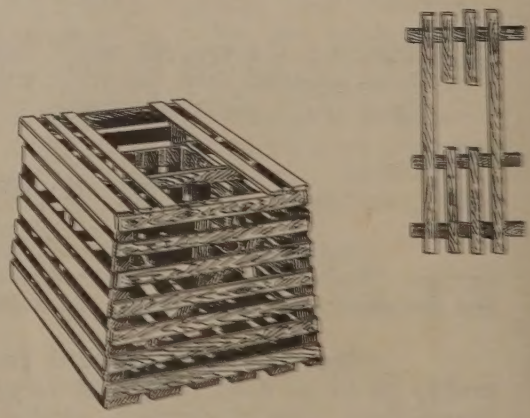

Figure 2 - Pyramid-type wooden lath trap with removable lid.

The trap funnel is made of lath. Its opening is 8 inches square and it extends 8 inches into the trap. Some traps have a removable lid which covers either one-half of the top or all of it. Other traps lack removable lids. Their catch must be removed through the funnel. Removable lids are held in place by adjacent lath which overlap the lid edges (fig. 2). The lid is prevented from working free by a nail driven through it and into the frame. This nail is placed about 1/2 inch from the edge of the funnel, and part of it is left protruding.

From 10 to 20 quarts of cement are poured into the bottom of the trap to cause the trap to land right side up when it is set. Some fishermen pour equal quantities of cement in each corner of the trap; others make two equal-sized strips of cement extending the width of the trap near its ends. The wet cement is poured over and between the slats so that they are partially encased and are held by the hardened strip. Some traps have cement blocks or bricks wired to the bottoms. The use of poured cement is the most common.

Buoy-or lift-lines are usually of twisted polyethylene, sisal or manila. Each trap has one such line which is attached either to a bridle or directly to one of the corner frames near the bottom of the trap. The line has a small float or a "ducker" at its midpoint to reduce chaffing on the bottom and a float at its end (fig. 3). The float is usually a gallon jug with a cork. The line must be long enough for the float to remain at the surface despite tides and currents.

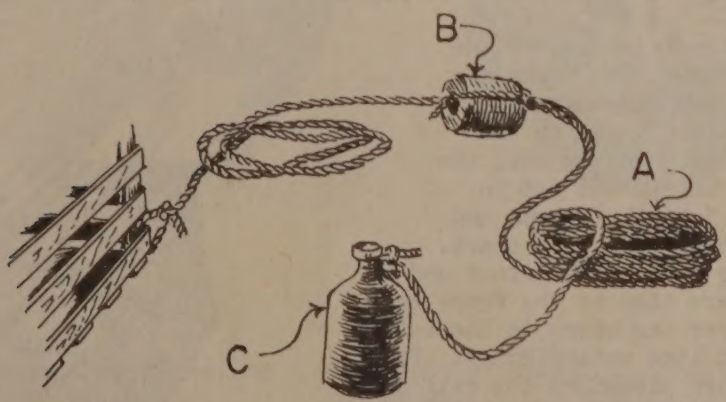

Figure 3 - Complete buoy and lift line: A - Line; B - Ducker; C - Float.

In trap fishing, as in practically all spiny lobster fishing, the catch is stored in wet burlap bags. Barrels have been used, but they may damage the catch. Trap fishermen use a simple wooden frame to hold the bags open. This simplifies placing the spiny lobsters in the bag.

At the conclusion of the fishing season the traps are brought ashore for repairs. Trap life is reduced by storm, teredo, and turtle damage. Storm damage is the least controllable of the three. Attempts to reduce teredo damage have been made by soaking the wooden traps with material such as diesel oil mixed with motor oil or creosote. Turtle damage can be reduced by protecting the sides of the wooden lath traps with galvanized poultry wire. Florida law allows wire strengthening to be used for 10 percent of a trap (fig. 4). Even with this extra care, most traps must be replaced at the end of a single fishing season.

Fish heads, canned sardines, and 8-ounce cans of pet-food having a fish base are used as bait. Usually a combination of one canned bait and a fish head is used.

One end of a 10-inch wire is looped through the eye socket of the fish head. The bait is lowered by the wire through the slat funnel and past its end. It is then raised so as to slide upward along the outer surface of the funnel, and the wire is passed between any two adjacent slats. When the bait is 1 to 2 inches from the top of the funnel, the loose end of the wire is wrapped once or twice around the nail which secures the trap lid. In preparing canned baits, the wire is looped through two holes punched near the lip of the can. One or two additional small holes are punched in the can with an ice pick to allow the contents to diffuse into the water. The canned bait is placed in the trap in the same way as is the fish head. Canned baits remain effective as long as 14 days. The fish head, which is eaten by trapped spiny lobsters, must be replaced on every re-set of the trap.

At the start of the fishing season, the traps are placed aboard the boats by the 2-man crew and taken to the fishing area. One by one, the traps are baited and set in depths of 3 to 15 fathoms and usually about 100 yards apart. In setting a trap, the float and its line are tied to the frame and trailed over the stern in the water to prevent line entanglement. The trap is then placed on the rail and is pushed overboard. Typically, sets are made on grass or sand flats and on the lee side of rock or reef formations to shield them from storm damage.

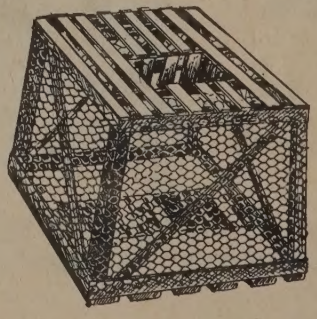

Figure 4 - Wire-protected lath trap.

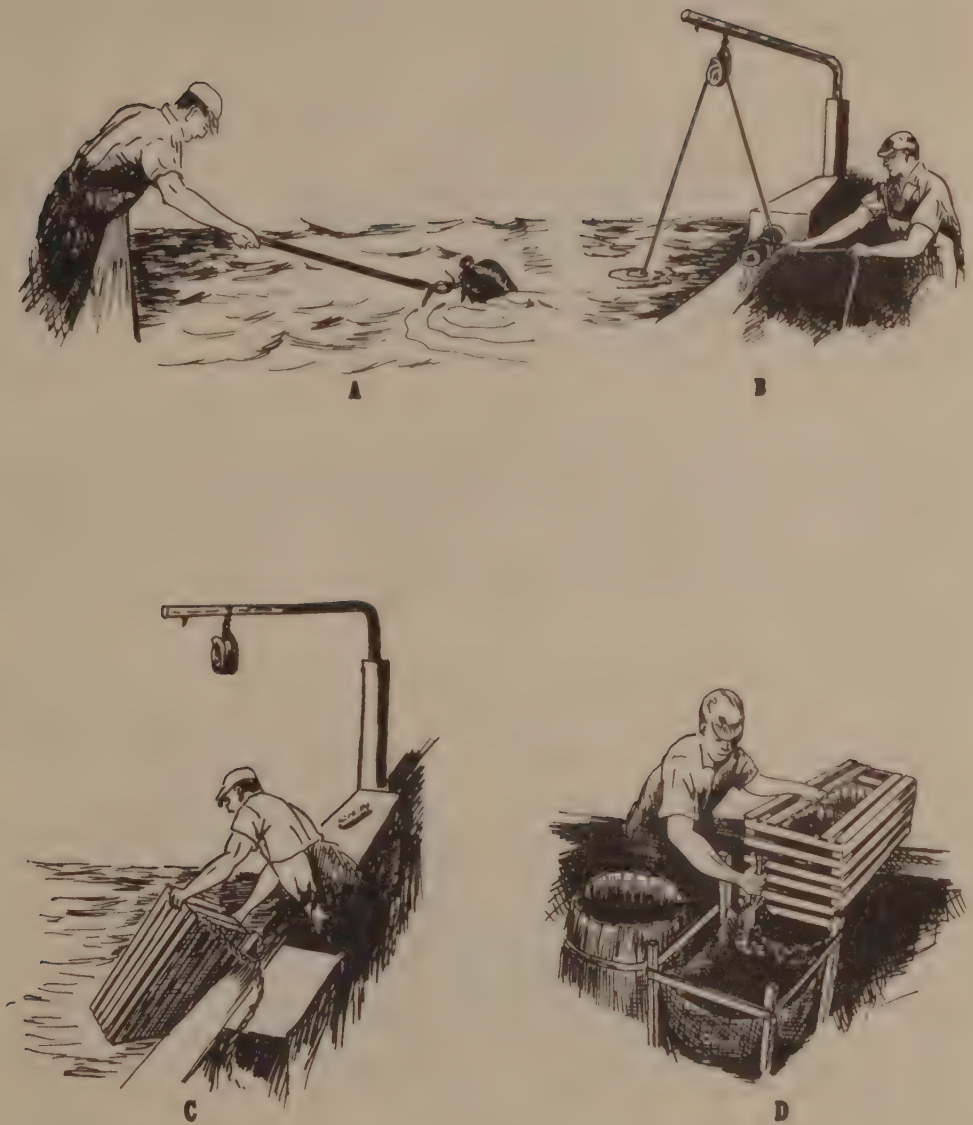

Figure 5 - Hauling a spiny lobster trap: A - Gaffing the buoy line; B - Using the davit; C - Boating the trap; D - Removing the catch.

In retrieving a trap, the boat is manuevered alongside the float to allow gaffing the float line (fig. 5). Some fishermen pull their traps every 3 days; others allow their traps to fish up to 12 days.

When the trap is boated, minor repairs are made, and then the trap is rebaited and brushed clean of fouling organisms. Before re-setting, a common practice is to leave a live spiny lobster in the trap as a lure. Traps are usually placed in their approximate original location. An experienced crew of two men can pull and re-set up to 150 traps in a 10-hour day.

Fishermen who employ lath traps in deeper waters, i.e., 50 to 120 feet, sometimes set them in "strings". A string consists of six to eight traps, placed 30 to 40 feet apart, that are bridled to a continuous main line. Only the ends of the string are buoyed.

In setting a baited string, the traps are all placed on the gunwale, the first trap is pushed overboard, and the others are paid out as the boat moves forward. In retrieving, the entire string is boated and the catch is removed. Catch varies according to season, location, and length of set. Under favorable conditions spiny lobster fishermen expect a yield of approximately 3 pounds per trap per week.

Ice Cans

Florida fishermen often use discarded metal ice-freezing molds to catch spiny lobster. These molds or cans are about 54 inches long, 24 inches wide, and 12 inches high, and are made of galvanized steel.

Ice cans must be modified to allow spiny lobsters but not their predators to enter and to allow water to drain out when the cans are lifted. These two aims are accomplished in a variety of ways.

Some fishermen mash down the center of the rim of the open end, leaving openings about 6 inches high on either side. Others crease the sides and mash the whole can to a uniform height of 6 inches. Others cut a flap with a torch in one of the 24-inch sides near the open end, and then bend this flap downward across the open end so as to form an entrance uniformly 6 inches high. Still others restrict the opening of the can to 6 inches with a board (fig. 6A & 6B).

Any of the following methods may be used to allow water to drain from the cans: Holes of 1 to 1½ inches in diameter can be punched in the sides and closed ends of the cans (fig. 6), the closed ends may be cut out and replaced with boards spaced 1/2 inches apart, or strips 2½ inches wide may be cut out of the closed ends of the cans.

To provide a lift line, a single hole is punched through the lip of the can and a loop of 3/8-inch wire is attached. The lift line, rigged with ducker and float, is attached to the loop.

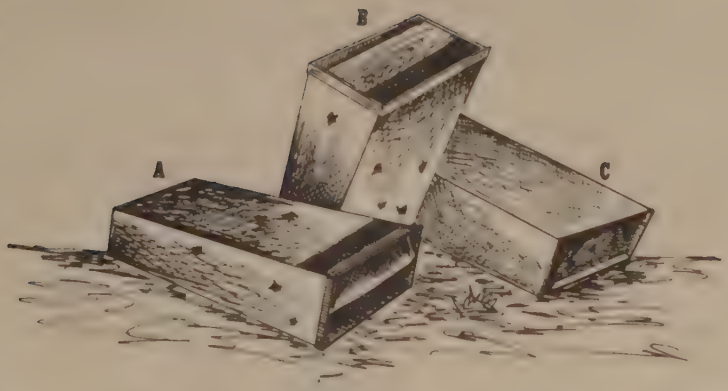

Figure 6 - Ice cans modified for spiny lobster fishing: A - Front opening restricted by metal flap; B - Front opening restricted by a board; C - Water drain holes punched in the end of a can.

Figure 7 - Drums modified for spiny lobster fishing.

Ice cans must be seasoned in sea water for approximately 2 weeks, to allow marine growths to cover the can, prior to use. They are fished in depths of 3 to 8 feet. Being rectangular, they are resistant to wave action in these shallow depths. Their expected life is 4 or 5 years.

Cans are fished unbaited. Spiny lobsters enter them (and the drums described in the next section) to hide during daylight or to molt. Except for being unbaited and set in shallower water, cans are set and hauled in the same manner as wooden lath traps. The catch in ice cans is more erratic than the catch in wooden lath traps. Catches of an individual can, after a 1-week set, may vary from nothing at all to about 15 pounds. Because spiny lobsters enter the cans to molt, much of the catch consists of soft-shelled lobsters which dealers are reluctant to purchase.

Drums

Used 55-gallon drums are employed in spiny lobster fishing after being prepared as follows.

One end is cut out, and the rim of this open end is mashed to a uniform height of 6 inches (fig. 7). This height permits spiny lobsters to enter but prohibits the entrance of large predators, sharks, and turtles. Two dozen or more holes, 1 to 1½ inches in diameter, are punched in the sides and bottom of the drum with a pickax. A single hole is punched through the lip of the drum and a loop of 3/8-inch wire cable is secured therein. A lift line with ducker and float is attached to the wire loop.

Although the drum life is 3 years, the added weight of the metal, and the tendency for wave action to roll the drum on the bottom, makes this gear less popular than either wooden lath traps or ice cans. It generally is used in waters 3 to 8 feet in depth, and it must be seasoned for 1 or 2 weeks before use. Drums are fished exactly as are the ice cans.

The catch of 55-gallon drums is comparable to that of ice cans both in quantity and in quality (soft-shelled individuals frequently are caught).

Bully Nets

The bully net can be considered a specialized dip net. Its bag of webbing, about 2 feet deep and formed of 2½-inch stretched mesh, is fastened to an iron hoop 18 to 24 inches in diameter. The hoop is attached at a right angle to a spruce or pine pole 1½ inches in diameter and 12 to 16 feet in length (fig. 8). Handles exceeding 16 feet are awkward to use.

Figure 8 - A bully net.

Figure 9 - A tickler.

Daytime bully-netting requires the use of a probe known as a "tickler" (fig. 9). This tickler consists of a curved metal rod 1/2 inch in diameter and 1 foot long, which is fastened to the end of a spruce or pine pole 1 inch in diameter and 11 to 16 feet in length.

Nighttime bully-netting requires a light. This may be a gasoline lantern or an auto headlight powered by an auto battery. To prevent glare, the auto light is usually built into the bottom of the boat so that its beam points straight down. Lanterns are usually hung over the side.

A glass-bottom bucket is needed for both day and night bully-netting. Protective gloves are useful in this operation.

Few Florida fishermen use this gear because it requires clear shallow water, calm weather, and constant attendance.

Two men operate the small skiff used in bully-netting. One man propels the skiff, while the other man manipulates the gear.

Figure 10 - Diver equipped for hand capturing spiny lobster.

The net-man uses the glass-bottom bucket for searching out spiny lobster. He finds them in hiding, by detecting their exposed antennae, and flushes them onto adjacent flats with the tickler. He then deftly thrusts the bully net down so that its webbing covers the spiny lobster. The animal entangles itself in the webbing and is lifted into the boat, removed, and placed in a wet burlap bag. Average daily yield per boat generally exceeds 150 pounds, live weight.

Hand Capture

This method is used by skin divers in Florida and rarely by commercial fishermen. Gear required includes a boat, gloves, face mask, swim fins, and optionally, a tickler (fig. 10). Calm weather and clear, shallow water are essential.

Skin divers most commonly attempt to maneuver the spiny lobster into a hole from which it cannot readily escape, and then they seize it with a gloved hand. Others grasp the animal when it is on open flats. Daily yield per diver is approximately 20 to 25 pounds.

FORMER GEAR AND METHODS

The following gear have been used in Florida in the past but are currently illegal.

Wire Traps

Wire traps were once used in Florida. Apparently these were made of galvanized chicken wire stretched over rectangular wooden frames. Their use is now illegal, and little information on their use in Florida is available. Feliciano (1958) describes the construction of wire traps used in Puerto Rico:

Figure 11 - A hoop net.

> The wire trap, locally known as "Nasa", is in general use throughout the Island. It is made in the shape of a broad arrowhead, and it varies in length from three to six feet, being three feet wide and eighteen inches high. It consists of a wooden framework made of mangrove wood, covered with galvanized chicken wire.

Figure 12 - Grab and grains: A - Grab uncocked; B - Two-tined barbed grain; C - Grab cocked; D - Three-tined barbless grain.

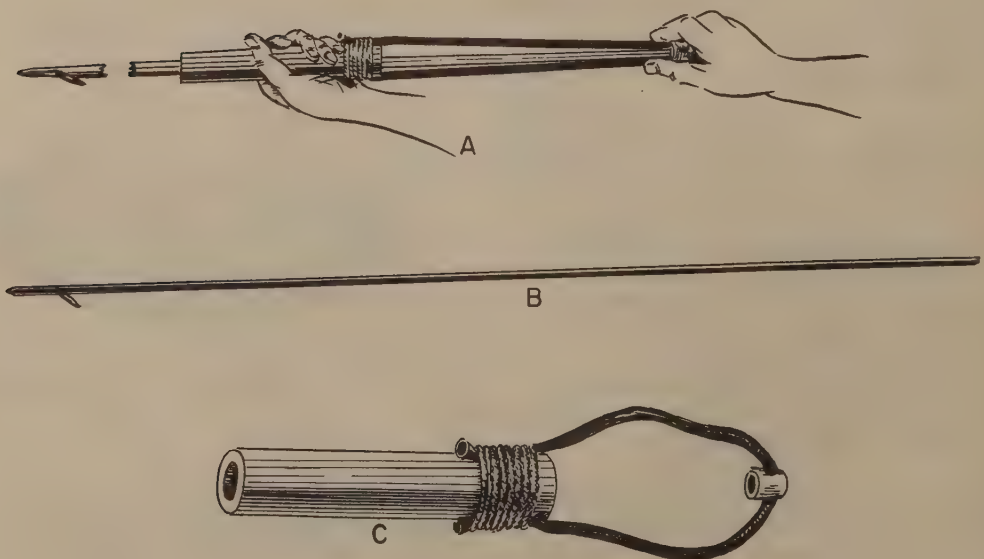

Figure 13 - Hawaiian sling: A - Armed sling; B - Spear; C - Unarmed sling.

Hoop Nets

The hoop net consists of a piece of 2½-inch, stretched mesh, netting supported on an iron hoop up to 6 feet in diameter. The netting is hung to allow a fair amount of bagging in its center. A bridle of 1/2-inch line is fastened to the hoop to allow the net to be hauled to the surface without spilling its contents. A 1/2-inch lift line is attached to the bridle (fig. 11). A lantern is used by the few fishermen who employ this gear at night.

The hoop net is no longer used because baited nets are illegal in Florida. The bait, a fish head or mullet fillet, is tied to the center of the netting. The net is then lowered from a skiff, bridge, or shoreline structure into clear, shallow water and may be watched through a glass-bottom bucket. When the spiny lobster crawls onto the mesh to eat the bait, the net is hauled, and the catch is placed in a wet burlap bag.

Some fishermen use several nets by setting them with glass-jug floats on the end of the lift line. This eliminates continuous observation of one net. Nets set in this fashion are checked every hour or two and hauled if need be. The normal daily yield from five or six of these nets is 150 to 200 pounds.

Smith (1948) states that:

> The South African industry ... relies almost entirely upon this method, which is practiced by the crews of motor vessels. The nets are set out in rows in water up to 25 fathoms deep and are buoyed in a manner similar to traps. By the time a complete set of nets has been placed, the first one is usually ready for hauling.

Grabs

The grab has two flat steel jaws which are cocked by being spread to their fullest extent. These jaws, when tripped over a spiny lobster, grasp it firmly. The triggering mechanism for the jaws is located at the place where the jaws join the handle of the grab (fig. 12A & 12C).

The grab is fastened to a spruce or pine pole 1 inch in diameter. The length of the pole depends on whether it is to be used by a boatman or a diver.

When the grab (short-handled) is used by a diver, necessary equipment includes skiff, face mask, swim fins, gloves, and burlap bag. If the grab (long-handled) is used by a boatman in the daytime, a skiff, glass-bottom bucket, tickler, gloves, and burlap bag are used. At night, a lantern or sealed-beam light replaces the tickler.

A diver seeks out the spiny lobster in its daytime hiding place and thrusts the grab down upon it. A boatman, using a tickler in the daytime or a lantern by night, also seeks out and captures the spiny lobster by thrusting the grab down upon it. He is rowed about over the fishing ground by a second man. The daily yield per diver approximates 20 to 30 pounds; the daily yield per boat approximates 100 to 150 pounds.

Grains

The grain is a 2 or 3 pronged spear with or without barbs on the inside of each tine (fig. 12B & 12D). The spear is attached to a spruce or pine pole 1 inch in diameter and not more than 14 feet long. A diver uses a short handle and a boatman uses a longer one.

For nighttime boat fishing, a lantern or sealed-beam headlight and a glass-bottom bucket are used to locate the spiny lobster.

When using grains, spiny lobster fishermen are careful to impale the animal in the carapace to avoid damage to the tail meat. Except for this difference, grain fishing is done by divers or boatmen in a manner similar to grab fishing. Yields compare with those stated for the grab.

Spears

The spear most commonly used is a rolled-steel rod, 3 feet long and 1/2 inch in diameter, with one end pointed and barbed. It is propelled by a device known as a Hawaiian sling, and it is used only by divers. The sling is made of a hollow wooden or metal tube 10 inches long with a length of surgical rubber tubing lashed to its sides to provide the propelling force (fig. 13). The diver is also equipped with gloves, fins, mask, and optionally a skiff.

The lobster is removed from the blunt end of the spear by passing the spear completely through the animal. The lobster is then boated and bagged. Daily yield per man may be 30 to 35 pounds.

APPROXIMATE COSTS OF SPINY LOBSTER GEAR (1959)

Boats and deck fittings	
Boat:	
skiff	$150 and up.
motor launch	$3,000 to $10,000
Davit materials	$10
Gasoline engine, 1 to 5 horsepower, with gypsy head	$100 to $150
Specific fishing devices	
Bully net, complete with handle	$6 to $7
Grab, complete with handle	$4 to $5
Grain, complete with handle	$3 to $4
Hawaiian sling with one spear	$5
Hoop net, complete with lift line	$12 to $13
Tickler, complete	$1 to $2
Trap:	
ice can, complete with cable, ducker, float and line	$4 to $5
oil drum, complete with cable, ducker, float and line	$4 to $5
wooden lath, complete with ducker, float and line	$5 to $7
Diver's swim equipment	
Face mask	$5
Snorkel	$2
Swim fins	$12
Bait	
Fish heads	5¢ a lb.
Petfood, canned	7¢ to 10¢ a can
Sardines, canned	8¢ to 10¢ a can
Miscellaneous	
Battery, 12-volt, auto, new	$20 to $25
Burlap bags, 100 lb. size	15¢ each
Glass-bottom bucket	$2
Gloves	$4.50
Lantern, gasoline	$5
Poultry wire, galv.	$10 to $23 per 150-ft. roll (will protect approx. 16 feet lath traps
Sealed-beam auto light	$5
Wire, baling (for securing baits in traps)	2¢ a foot.

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